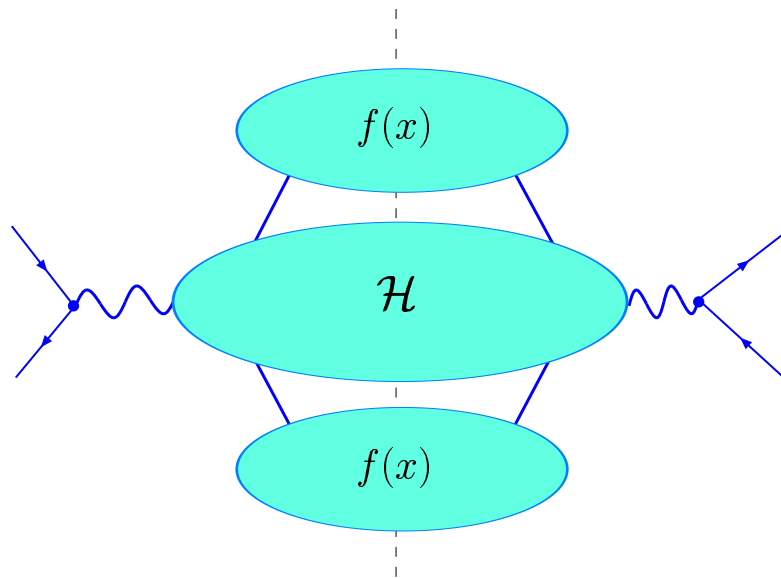


QCD factorization in hard and soft regions

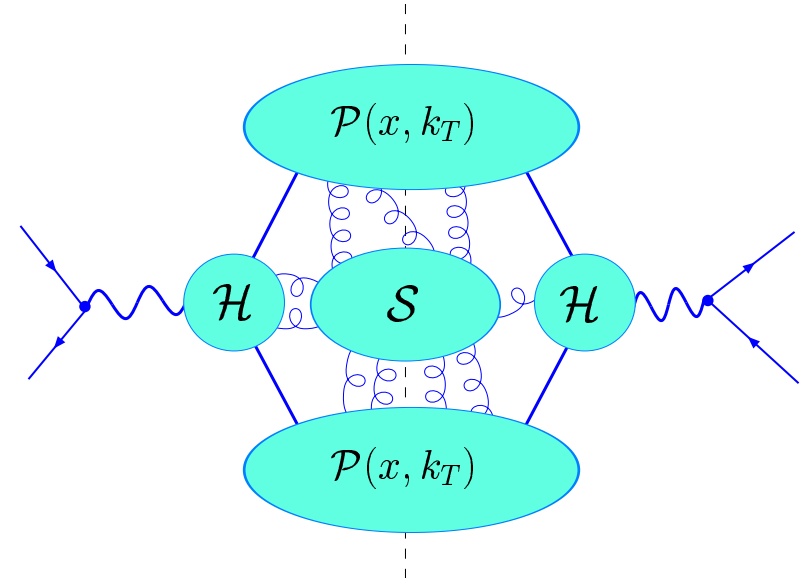
Finite-order (FO) factorization

$$\Lambda_{QCD}^2 \ll (p_T^2)_{EW} \sim Q^2$$

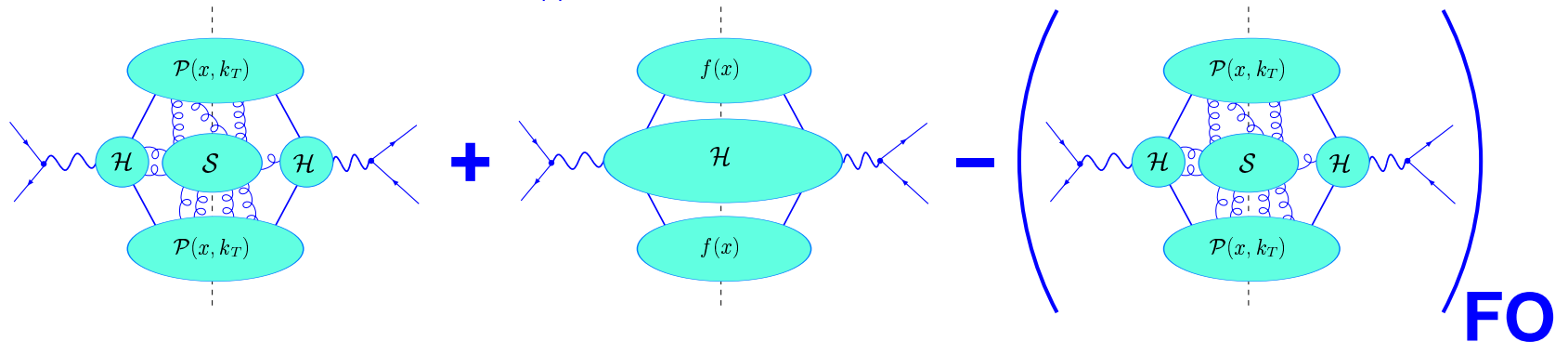


Small- p_T factorization

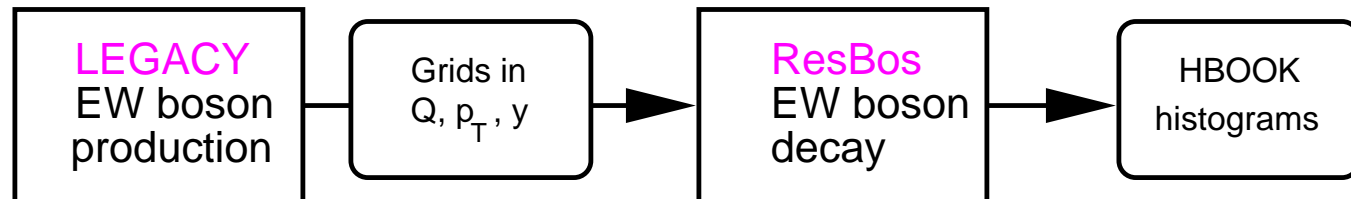
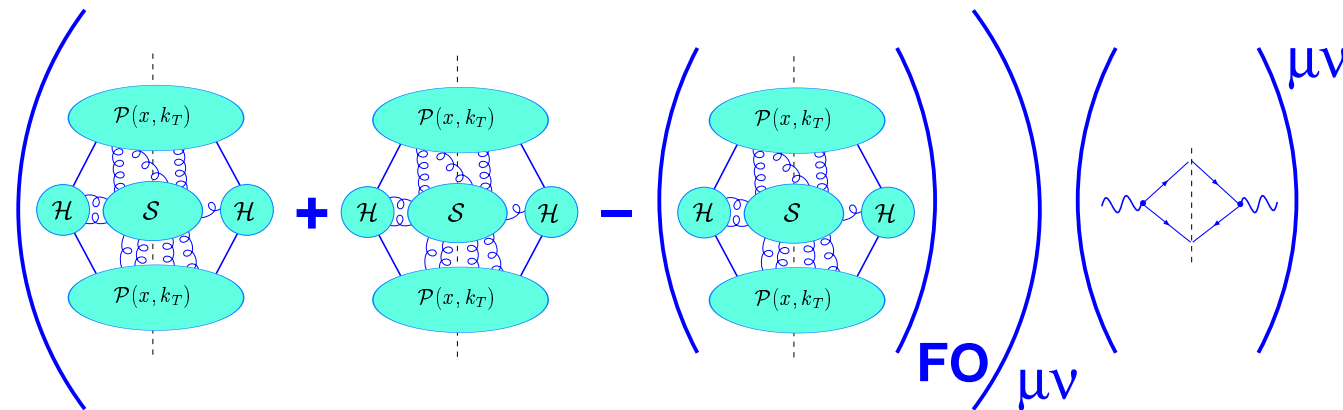
$$\Lambda_{QCD}^2 \ll (p_T^2)_{EW} \ll Q^2$$



Solution for all $(p_T)_{EW}$:



Organization of a resummation calculation



Legacy++: calculates resummed cross sections for EW boson production on a grid of Q , $(p_T)_{EW}$, and y ; C++

ResBos: interpolates and matches resummed grids; models decay of EW boson; Fortran

Implementation of electroweak corrections in W boson production

Initial-state, final-state, and interference $\mathcal{O}(\alpha)$ EW corrections can be considered separately (Baur, Keller, Wackerroth)

Final-state corrections

- ✓ large effect on M_T
- ✓ do not modify QCD part of resummed cross sections
- ✓ easy to implement in ResBos

Initial-state corrections

- ✓ smaller effect on M_T
- ✓ require to modify resummed QCD part
- ✓ require quark PDFs with EW corrections

★ Could implementation of initial-state and interference corrections be avoided?